IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	Jose Renato Santos, et al.	Examiner: Afsar M. Qureshi
Serial No.:	10/814,073	Group Art Unit: 2616
Filed:	March 30, 2004	Docket No.: 100201443-2
Title:	A Congestion Control System	

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Appeal Brief is filed in response to the Final Office Action mailed December 11, 2007 and Notice of Appeal filed on March 11, 2008.

AUTHORIZATION TO DEBIT ACCOUNT

It is believed that no extensions of time or fees are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 C.F.R. § 1.136(a), and any fees required (including fees for net addition of claims) are hereby authorized to be charged to Hewlett-Packard Development Company's deposit account no. 08-2025.

I. REAL PARTY IN INTEREST

The real party in interest is Hewlett-Packard Development Company, LP, a limited partnership established under the laws of the State of Texas and having a principal place of business at 20555 S.H. 249 Houston, TX 77070, U.S.A. (hereinafter "HPDC"). HPDC is a Texas limited partnership and is a wholly-owned affiliate of Hewlett-Packard Company, a Delaware Corporation, headquartered in Palo Alto, CA. The general or managing partner of HPDC is HPQ Holdings, LLC.

II. RELATED APPEALS AND INTERFERENCES

There are no known related appeals, judicial proceedings, or interferences known to appellant, the appellant's legal representative, or assignee that will directly affect or be directly affected by or have a bearing on the Appeal Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1 – 20 are pending in the application and stand finally rejected. Claims 21 – 24 were canceled. The rejection of claims 1 – 20 is appealed.

IV. STATUS OF AMENDMENTS

In a Final Office Action mailed December 11, 2007, the examiner objected to Figure 1 as not having descriptive labels. An after-final response was filed on February 11, 2008. This after-final response added descriptive labels to Figure 1. An Advisory Action mailed February 19, 2008 indicates that the amendment was entered.

No other amendments were made after receipt of the Final Office Action. All amendments have been entered.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The following provides a concise explanation of the subject matter defined in each of the claims involved in the appeal, referring to the specification by page and line number and to the drawings by reference characters, as required by 37 C.F.R. § 41.37(c)(1)(v). Each element of the claims is identified by a corresponding reference to the specification and drawings where applicable. Note that the citation to passages in the specification and drawings for each claim element does not imply that the limitations from the specification and drawings should be read into the corresponding claim element or that these are the sole sources in the specification supporting the claim features.

Claim 1

A method for controlling congestion in a communications network, including:

receiving congestion feedback data relating to said network (Fig. 5, #506: incoming ACK packets are received; p. 20, lines 10-11);

adjusting both a window limit and a rate limit based on said congestion feedback data (Fig. 6, #606/608: the rate limit and the window limit are adjusted; p. 22, lines 1-5. See also p. 9, lines 20-30 discussing adjusting both the window and rate limits); and

injecting data packets onto said network according to said window limit and said rate limit, wherein the window limit controls a number of packets in transit between source and destination nodes and the rate limit controls a rate at which the source node injects packets into the communications network (Fig. 3, #324: data packets are transmitted into the network; p. 18, line 32-p. 19, line 1. See also p. 9, lines 29-31 stating data packets are injected into the network when permitted by both the window and rate limits. For discussion of window limit see p. 2, line 26 – p. 3, line 4. For discussion of rate limit see p. 3, lines 10-14.).

Claim 2

A method according to claim 1, wherein said adjusting includes:

decreasing said rate limit and said window limit if said network is determined to be congested based on said congestion feedback data (Both the rate limit and the window limit are decreased: see p. 9, lines 1-3; p. 10, lines 12-22; and p. 11, lines 6-8).

Claim 13

A system (Figs. 1 and 2, #100) for controlling congestion in a communications network (Figs. 1 and 2, #108), including:

a congestion control module (Figs. 1 and 2, #110) adapted to adjust at least one of a window limit and a rate limit based on congestion feedback data relating to said network, and to limit injection of packets into said network according to both said window limit and said rate limit, wherein the window limit controls a number of packets in transit between source and destination nodes and the rate limit controls a rate at which the source node injects packets into the communications network (The congestion control module 110 adjusts the window limit, rate limit, or both of these limits: see p. 8, lines 2-4, and p. 9, lines 20-31. For discussion of window limit see p. 2, line 26 – p. 3, line 4. For discussion of rate limit see p. 3, lines 10-14.).

Claim 14

A system according to claim 13, wherein said congestion control module is adapted to decrease said rate limit and said window limit if said network is determined to be congested based on said congestion feedback data (Both the rate limit and the window limit are decreased: see p. 9, lines 1-3; p. 10, lines 12-22; and p. 11, lines 6-8).

Claim 17

A system (Figs. 1 and 2, #100) for controlling congestion in a communications network (Figs. 1 and 2, #108), comprising:

means for receiving congestion feedback data relating to said network (example means is receive acknowledgement module 212 of control system 110 of Fig. 2. The receive acknowledge module receives ACK packets from the network; see p. 7, lines 27-30);

means for determining which of a window limit and a rate limit are causing congestion in the network (example means is congestion control system 110 of Fig. 2. The congestion control system determines the congestion state of the network; see p. 11, lines 22-24; p. 11, line 29 – p. 12, line 6);

means for adjusting at least one of the window limit and the rate limit based on said congestion feedback data (example means is increase/decrease module 214 of control system 110 of Fig. 2. The increase/decrease module adjusts both the window limit and rate limit; see p. 8, lines 6-7); and

means for injecting data packets onto said network according to both said window limit and said rate limit (example means is transmit packet module 208 of control system 110 of Fig. 2: the transmit packet module regulates the sending of data packets; see p. 8, lines 10-12. See also p. 11, lines 20-22).

Claim 18

A system according to claim 17, wherein said means for adjusting includes: means for decreasing said rate limit and said window limit if said network is determined to be congested based on said congestion feedback data (Example means is the control system 110. Both the rate limit and the window limit are decreased: see p. 9, lines 1-3; p. 10, lines 12-22; and p. 11, lines 6-8).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-20 are rejected under 35 USC § 102(e) as being anticipated by USPN 7,136,353 (Ha).

VII. ARGUMENT

The rejection of claims 1 – 20 is improper, and Applicants respectfully request reversal of these rejections.

The claims do not stand or fall together. Instead, Applicants present separate arguments for various claims. Each of these arguments is separately argued below and presented with separate headings and sub-heading as required by 37 C.F.R. § 41.37(c)(1)(vii).

Overview of Claims and Primary Reference (Ha)

As a precursor to the arguments, Applicants provide an overview of the field, primary reference (Ha), and claims.

Network congestion arises when data packets sent or injected into a network exceed the capacity of the network. Generally, two ways exist to control network congestion. A first way (called window limit) limits the number of packets that can be concurrently in transit from a source node to a destination node. In other words, the window limit controls the number of packets that are in transit to the destination node (i.e., controls size of window). A second way (called rate limit) limits the rate at which the source node injects packets into the network. In other words, the rate limit controls the time interval between packets injected into the network.

Ha teaches a congestion control mechanism that controls network congestion. Specifically, the congestion control mechanism in Ha adjusts the size of a congestion window to limit the number of packets that can be concurrently in transmit from one node to another node. Ha adjusts the size of this window to control congestion.

The claims are directed to receiving congestion feedback data relating to a network and then adjusting both a window limit and a rate limit based on the congestion feedback data. For example, a congestion control system maintains both a window limit and a rate limit for each flow and controls both of these limits to control network congestion.

Claim Rejections: 35 USC § 102(e)

Claims 1-20 are rejected under 35 USC § 102(e) as being anticipated by USPN 7,136,353 (Ha). These rejections are traversed.

The claims recite various recitations that are not taught in Ha. Some examples are provided below with respect to different claims groupings that are separately argued with separate sub-headings.

Sub-Heading: Claim 1

As one example, claim 1 recites receiving congestion feedback data relating to a network and then adjusting both a window limit and a rate limit based on the congestion feedback data. Ha does not teach this element.

Ha teaches TCP architecture having a congestion control mechanism. The congestion control mechanism "increases the size of the congestion window for a particular connection, this increase causes the flow control mechanism to immediately transmit additional data packets over that connection" (see Ha at column 6, lines 54-59). Thus, Ha teaches only adjusting the window limit, not adjusting both the window limit and rate limit. Ha does not even discuss rate limit.

Anticipation under section 102 can be found only if a single reference shows exactly what is claimed (see *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 227 U.S.P.Q. 773 (Fed. Cir. 1985)). For at least these reasons, independent claim 1 and its dependent claims are not anticipated by Ha.

As another example, claim 1 recites that the window limit controls a number of packets in transit between source and destination nodes and the rate limit controls a rate at which the source node injects packets into the communications network. Ha never discusses a rate limit. Again, Ha only discusses changing the window limit.

Window limit and rate limit are two very distinct concepts for controlling network traffic. The window limit controls the size of the window or number of packets being transmitted by the source node. By contrast, the rate limit controls the rate at which packets are injected through the window. These concepts are quite different. Ha only teaches adjusting the window limit.

For a prior art reference to anticipate under section 102, every element of the claimed invention must be identically shown in a single reference (see *In re Bond*, 910 F.2d 831, 15 U.S.P.Q.2d 1566 (Fed. Cir. 1990)). For at least these reasons, independent claim 1 and its dependent claims are not anticipated by Ha.

As another example, claim 1 recites injecting data packets into the network according to the window limit and the rate limit. Ha never discusses a rate limit. Again, Ha only discusses changing the window limit.

Anticipation is established only when a single prior art reference discloses each and every element of a claimed invention united in the same way (see *RCA Corp. v. Applied Digital Data Systems, Inc.*, 730 F.2d 1440, 1444 (Fed. Cir. 1984)). For at least these reasons, independent claim 1 and its dependent claims are not anticipated by Ha.

Sub-Heading: Claim 13

Claim 13 recites a congestion control module that limits injection of packets into a network according to both a window limit and a rate limit. Ha does not teach this element.

Ha teaches TCP architecture having a congestion control mechanism. The congestion control mechanism "increases the size of the congestion window for a particular connection, this increase causes the flow control mechanism to immediately transmit additional data packets over that connection" (see Ha at column 6, lines 54-59). Thus, Ha teaches only adjusting the window limit, not adjusting both the window limit and rate limit. Ha does not even discuss rate limit. Ha never teaches his congestion control mechanism has architecture for controlling both window limit and rate limit.

Anticipation under section 102 can be found only if a single reference shows exactly what is claimed (see *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 227 U.S.P.Q. 773 (Fed. Cir. 1985)). For at least these reasons, independent claim 13 and its dependent claims are not anticipated by Ha.

As another example, claim 13 recites that the window limit controls a number of packets in transit between source and destination nodes and the rate limit controls a rate at which the source node injects packets into the communications network. Ha never discusses a rate limit. Again, Ha only discusses changing the window limit.

For a prior art reference to anticipate under section 102, every element of the claimed invention must be identically shown in a single reference (see *In re Bond*, 910 F.2d 831, 15 U.S.P.Q.2d 1566 (Fed. Cir. 1990)). For at least these reasons, independent claim 13 and its dependent claims are not anticipated by Ha.

Sub-Heading: Claim 17

Claim 17 recites receiving congestion feedback data and injecting data packets into the network according to both a window limit and a rate limit. Ha does not teach this element.

Ha teaches TCP architecture having a congestion control mechanism. The congestion control mechanism "increases the size of the congestion window for a particular connection, this increase causes the flow control mechanism to immediately transmit additional data packets over that connection" (see Ha at column 6, lines 54-59). Thus, Ha teaches only adjusting the window limit. Ha does not even discuss rate limit.

Anticipation under section 102 can be found only if a single reference shows exactly what is claimed (see *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 227 U.S.P.Q. 773 (Fed. Cir. 1985)). For at least these reasons, independent claim 17 and its dependent claims are not anticipated by Ha.

As another example, claim 17 recites determining which of a window limit and rate limit are causing congestion in the network. Ha never discusses a rate limit. Again, Ha only discusses changing the window limit.

Anticipation is established only when a single prior art reference discloses each and every element of a claimed invention united in the same way (see *RCA Corp. v. Applied Digital Data Systems, Inc.*, 730 F.2d 1440, 1444 (Fed. Cir. 1984)). For at least these reasons, independent claim 17 and its dependent claims are not anticipated by Ha.

Sub-Heading: Claims 2, 14, 18

Claim 2 is selected for discussion. Specifically, claim 2 recites decreasing said rate limit and said window limit if said network is determined to be congested based on said congestion feedback data. Ha does not teach this element.

The examiner cites Ha at column 10, line 64 to column 11, line 28. This section only discusses adjusting the congestion window: "If the update function does not detect congestion at step 512, the process increases the congestion window at step 516." Ha also then states: "In another embodiment, the congestion window may be increased or decreased ...." Nowhere does Ha teach decreasing both the window limit and the rate limit.

CONCLUSION

In view of the above, Applicants respectfully request the Board of Appeals to reverse the Examiner's rejection of all pending claims.

Any inquiry regarding this Amendment and Response should be directed to Philip S. Lyren at Telephone No. 832-236-5529. In addition, all correspondence should continue to be directed to the following address:

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VIII. Claims Appendix

1. A method for controlling congestion in a communications network, including:

receiving congestion feedback data relating to said network;

adjusting both a window limit and a rate limit based on said congestion feedback data; and

injecting data packets onto said network according to said window limit and said rate limit, wherein the window limit controls a number of packets in transit between source and destination nodes and the rate limit controls a rate at which the source node injects packets into the communications network.

2. A method according to claim 1, wherein said adjusting includes:

decreasing said rate limit and said window limit if said network is determined to be congested based on said congestion feedback data.

3. A method according to claim 1, wherein said adjusting includes:

increasing, based on a limiting factor, at least one of said rate limit and said window limit if said network is determined not to be congested based on said congestion feedback data.

4. A method according to claim 3, wherein said limiting factor is determined based on whether a transmission of a data packet was most recently limited by at least one of said rate limit and said window limit.

5. A method according to claim 4, wherein said rate limit is increased if said limiting factor is determined by said rate limit.

6. A method according to claim 4, wherein said window limit is increased if said limiting factor is determined by said window limit.

7. A method according to claim 4, wherein both said rate limit and said window limit is increased if said limiting factor is determined by both said rate limit and said window limit.

8. A method according to claim 4, wherein said limiting factor is a value between a predetermined high threshold and a predetermined low threshold.

9. A method according to claim 4, wherein said determining of said limiting factor includes increasing or decreasing said limiting factor by an amount corresponding to a size of the data packet for which injection was limited.

10. A method according to claim 9, wherein said limiting factor is increased by said amount if the transmission of a data packet was limited by said window limit.

11. A method according to claim 9, wherein said limiting factor is decreased by said amount if the transmission of a data packet was limited by said rate limit.

12. A method according to claim 1, wherein said adjusting is performed by an Additive Increase Multiplicative Decrease response process.

13. A system for controlling congestion in a communications network, including:

a congestion control module adapted to adjust at least one of a window limit and a rate limit based on congestion feedback data relating to said network, and to limit injection of packets into said network according to both said window limit and said rate limit, wherein the window limit controls a number of packets in transit between source and destination nodes and the rate limit controls a rate at which the source node injects packets into the communications network.

14. A system according to claim 13, wherein said congestion control module is adapted to decrease said rate limit and said window limit if said network is determined to be congested based on said congestion feedback data.

15. A system according to claim 13, wherein said congestion control module is adapted to increase, based on a limiting factor, at least one of said rate limit and said window limit if said network is determined not to be congested based on said congestion feedback data.

16. A system according to claim 15, further including means for determining said limiting factor based on whether a transmission of a data packet was most recently limited by at least one of said rate limit and said window limit.

17. A system for controlling congestion in a communications network, comprising:

means for receiving congestion feedback data relating to said network;

means for determining which of a window limit and a rate limit are causing congestion in the network;

means for adjusting at least one of the window limit and the rate limit based on said congestion feedback data; and

means for injecting data packets onto said network according to both said window limit and said rate limit.

18. A system according to claim 17, wherein said means for adjusting includes:

means for decreasing said rate limit and said window limit if said network is determined to be congested based on said congestion feedback data.

19. A system according to claim 17, wherein said means for adjusting includes:

means for increasing, based on a limiting factor, at least one of said rate limit and said window limit if said network is determined not to be congested based on said congestion feedback data.

20. A system according to claim 19, wherein said limiting factor is determined based on whether a transmission of a data packet was most recently limited by at least one of said rate limit and said window limit.

21. – 24. (canceled)

IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None.